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|---|---|----------|
| 3. Pileus azonate; spores white.
Pileus zonate or subzonate. | <i>L. affinis</i> Pk. | 4. |
| 4. Stipe scrobiculate-spotted, hollow.
Stipe smooth, not spotted, solid. | <i>L. insulsus</i> Fr.
<i>L. zonarius</i> (Bull.) Fr. | |
| 5. Stipe spotted, hollow; pileus gray or grayish-lilac.
Stipe not spotted (or rarely so in <i>L. trivialis</i>). | <i>L. maculatus</i> Pk. | 6. |
| 6. Lamellae staining when wounded.
Lamellae not staining. | | 7.
9. |
| 7. Pileus gray with pink or lilac shades; lamellae staining greenish.
Pileus gray with greenish shades; lamellae staining cinereous. | <i>L. blennius</i> Fr. | 8. |
| 8. Pileus 5-18 cm.; stipe 2.5-15 cm. long.
Pileus 2.5-5 cm.; stipe equal to or longer than diameter. | <i>L. trivialis</i> Fr.
<i>L. trivialis gracilis</i> Pk. | |
| 9. Lamellae and spores white; stipe 5-7 cm. long.
Lamellae and spores yellowish; stipe 4 cm. long. | <i>L. cinereus</i> Pk.
<i>L. acer</i> (Bolt.) Fr. | |
- NEW YORK BOTANICAL GARDEN.

THE PITH CELLS OF PHYTOLACCA DECANDRA *

BY HENRY KRAEMER

The structure of pith cells is so characteristic and so constant for certain species and genera, as was pointed out by Gris, that it will in all probability be found to have a taxonomic value in deciding the position of a number of more or less disputed genera and families. While the anomalous structure of the root, stem and leaves of certain species of *Phytolacca* has been more or less carefully studied, the pith cells of *Phytolacca decandra* are so marked in character as to warrant our attention in this connection.

The pith of this plant is unusually large, its diameter being about five sixths that of the entire stem. The active pith cells are more or less hexagonal in transverse section, the diameter being about three times that of a longitudinal section. The protoplasm lies near the walls and contains a number of chloroplastids and a single nucleus, and surrounding the latter are not infrequently a number of plastids. Some of the cells, which are either nearly isodiametric or considerably elongated, have the large vacuoles replaced by raphides and a small amount of mucilage. The

* Read before Section G of the American Association for the Advancement of Science, Pittsburg, July 3, 1902.

walls are thin and without pores, and consist, particularly the longitudinal walls, of lamellae of cellulose and cellulose-mucilage. The mucilaginous character of the wall may be readily detected in glycerin mounts of sections of material previously treated with alcoholic solution of methylene blue.

Usually between the sixth and eighth internodes from the top of the stem certain changes are observed in the character of the central pith cells. Some of the cells become more or less rounded in outline and appear to lose a part of their organized contents. The intercellular spaces become larger and with the subsequent breaking down of some of the cell walls, as well as the collapsing of some of the cells, large biconvex cavities are produced at quite regular intervals and extending to the lowest internode. These chambers are from one third to two thirds the width of the stem, and are from 1 to 4 mm. in depth. Separating these cavities are biconcave diaphragms consisting of cells similar to the other pith cells, only they contain small masses of mucilage and considerable protein matter, and in some of the cells the sap is replaced by air, giving the diaphragms a white appearance.

We have thus in *Phytolacca decandra* a pith differentiated into two parts, a peripheral portion made up of active cells, as already described, and a central portion consisting of biconcave diaphragms composed of both active and inactive cells, separated at regular intervals by cavities. The latter appear to be formed by the abstraction of water from the cells of this region as a result of the development of other parts of the stem. This view seems to be confirmed by the fact that in the process of drying that portion of the pith in the upper internodes, which is not already metamorphosed, becomes thus differentiated.

The central pith somewhat resembles the pith of certain xerophytic Compositae, and while the chambers might be looked upon as latent or neglected water reservoirs, still they do not seem to have this function.

The metamorphosed pith in *Phytolacca decandra* seems, on the one hand, to have a certain resemblance in origin to the hollow internodes of the stems of the Polygonaceae, and on the other hand to resemble the heterogeneous or modified pith of the

Magnoliaceae, with this difference, that the presence of lignin in the cells of the latter would tend to prevent the collapse and rupture of the cells to such a great extent.

The Chenopodiales being distinguished by an anomalous structure of stem and roots, as are also some of the Ranales, it is possible that a further study of the pith cells of these two orders together with those of the Polygonales will furnish additional ground for the position given these orders with reference to each other by the newer classification of Engler and Prantl.

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SHORTER NOTES

A NEW STATION FOR ISOTRIA AFFINIS.—Forty years ago, Mr. Austin discovered a new species of orchid at Closter, N. J. It was described in the fifth edition of Gray's Manual under the name *Pogonia affinis* Austin. It should now be known as *Isotria affinis* (Austin) Rydb., being a close relative of *Pogonia verticillata* (Willd.) Nutt., the type of the Rafinesquian genus *Isotria*. Specimens from Mr. Austin's original collection are the only ones that are found in the herbaria of the New York Botanical Garden and Columbia University. There are, however, records of two other stations, besides that at Closter, viz., one in Connecticut and one in southern New York. This summer, this exceedingly rare plant has turned up in an unexpected locality — at Burlington, Vermont. Mrs. Henry Holt, the rediscoverer, first wrote to Dr. Britton about her discovery and afterwards sent three fine photographs of the plant. On the back of one of these is found the following note: "Found in bloom on the first of June and did not fade till the ninth. Found in rich leaf mould with sand, at foot of old hemlock stump, in damp ground at foot of hill on our place. Ground had been cleared of quick growth of aspen, yellow birch, etc."

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